



ISSN: 2349-9141

Available online at <http://www.ijrr.com>

International Journal of Information Research and Review
Vol. 2, Issue, 07, pp. 956-957, July, 2015



OPEN ACCESS JOURNAL

Full Length Research Paper

ARTERIAL BLOOD GAS ANALYSIS IN ORGAN PHOSPHORUS COMPOUND POISONING

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Received 27th June 2015; Published 31st July 2015

Abstract

We present a study of blood gas parameters in 20 cases of organophosphorus compound poisoning to study the Arterial Blood Gases in subjects of organophosphorus compounds poisoning through ABG analysis in Government General Hospital, Rajiv Gandhi Medical Sciences, Ongole.

Keywords: Organ phosphorous poisoning, ABG Analysis.

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To cite this paper: Dr. Viswa Kumar, R., Dr. Chandra Mohan, V., Dr. Chuhitha, S. and Dr. Umapallavi 2015. Arterial blood gas analysis in organ phosphorus compound poisoning, International Journal of Information Research and Review. Vol. 2, Issue, 07, pp. 956-957, July, 2015.

INTRODUCTION

The organophosphates which were first discovered more than a hundred years ago are at present the predominant group of insecticides employed globally for pest control. The compounds are toxic to humans and represent an important source of poison as suicidal agents domestically, and in some occupations. Death due to intake of organophosphorus insecticides has been reported frequently from different parts of India. The important complication and cause of death in organophosphorus poisoning is respiratory failure. This result in combination of respiratory muscle weakness, central respiratory depression, increased bronchial secretions, bronchospasm and pulmonary edema. In organophosphorus compound it is Type 2 ventilatory failure that takes place. Ventilatory failure is defined as condition in which the pulmonary system is unable to meet the metabolic demands of body in relation to carbon dioxide homeostasis (Alfred, 1956). The diagnosis cannot be made without arterial blood gas management.

MATERIALS AND METHODS

A retrospective study was done of 20 cases admitted to Government General Hospital, Rajiv Gandhi Institute of Medical Sciences, Ongole from June 2012 to May 2013. Patients were selected irrespective of age and sex. However patients with concomitant illness (or) condition likely to accentuate the respiratory failure due to organ phosphorus poisoning were excluded from study. Each patient enrolled for study underwent detailed clinical examination as per proforma which included presence of respiratory failure. A provisional

diagnosis of organophosphorus compounds poisoning by patients was made on basis of a definite history of organophosphorus compound poisoning by patient or, attends and features of poisoning. An arterial blood gas sample was taken immediately after admission before atropine was started.

RESULTS

ABG analysis was done in 20 cases, of 20 cases 11 are males and 09 are females (1). The male predominance indicates easy accessibility of organophosphorus compounds. Out of 20 cases mode of consumption was ingestion in 16 cases and inhalation in 4 cases. Out of 20 cases of O.P. compound poisoning 15 cases show miosis, 08 cases presented with altered sensorium, 05 cases had fasciculations and 05 cases with bronchial secretions. So in majority cases we notice the miosis and altered level of consciousness. (Table 2)

Table 1.

Gender	No. of Cases	Percentage
Male	11	55%
Female	09	45%
Total	20	100%

Table 2.

Symptoms at the time of presentation	No. of Cases (20)	Percentage
Miosis	15	75
Altered sensorium	08	40
Fasciculations	05	25
Bronchial secretions	05	25

Out of 20 cases of ABG analysis, 08 cases showed respiratory acidosis of which 4 survived & 4 expired. 05 cases showed respiratory alkalosis, of which 04 patients survived and 01 expired. 05 showed metabolic acidosis of which 05 expired. 13 cases showed Metabolic alkalosis of which 11 cases survived 2 expired. So respiratory acidosis & metabolic acidosis have high mortality (2) (3). (Table 3)

Table 3. ABG analysis in 20 cases

ABG analysis	No. of patients	No. of cases	
	N =20	Survived	Expired
Metabolic Alkalosis	13(65%)	11(84%)	2(15%)
Respiratory Acidosis	08(40.0%)	04 (50.0%)	4 (50%)
Respiratory Alkalosis	05(25%)	4 (80%)	1 (20%)
Metabolic Acidosis	05(4.8%)	0	05 (100%)

Arterial blood gas analysis in organophosphate poisoning cases

Sl.no	PCO2 (mmHG)	PO2(mmHG)
1.	33.8	58.1
2.	52.6	56.1
3.	53.3	49.7
4.	56.3	77.9
5.	38.6	75.5
6.	40.3	63.6
7.	37.3	48.4
8.	50.6	53.0
9.	33.6	94.4
10.	69.1	22.2
11.	46.6	88.2
12.	18.3	88.2
13.	32.1	101.1
14.	52.6	66.1
15.	40.2	82.8
16.	39.0	91.9
17.	56.5	87.9
18.	50.5	83.0
19.	30.4	103.6
20.	37.4	48.4

DISCUSSION

The organophosphate compound poisoning is the commonest of all acute poisoning cases in our area. Diagnosis of Organophosphate poisoning is based on history of consumption of definite exposure and clinical presentation. In our study out of 20 cases we assessed Po₂ and Pco₂ levels in study group, we observed Hypoxemia (<83) out of which 3 cases were in the range of 83- 75mmHG and 9 were below 75mmHG.

Out of 20 cases, 08 cases were observed as Hypercapnic i.e., Pco₂ > 48mmHG. Out of 05 cases of respiratory alkalosis, 3 cases showed respiratory alkalosis with hypoxemia. Out of these 1 case was expired. Though these patients were conscious they were hypoxic by ABG analysis and need oxygen therapy. ABG analysis is very sensitive in providing valuable information about adequacy of gas exchange and perfusion which was not evident on physical examination. Altered Bicarbonate levels are found. Bicarbonate levels <22m.mol/L were seen in 5 cases and >26m.mol/L were seen in 13 cases.

Conclusion

By doing ABG analysis acid – base status is also often altered leading to acidosis and alkalosis (both Respiratory and Metabolic). Another specific finding is hypoxemia where a good number of cases show PO₂ level of less than 75mmHG which is a major contributing factor for mortality particularly in life threatening cases. Respiratory acidosis and metabolic acidosis have high mortality than respiratory alkalosis with hypoxemia. We conclude that Arterial Blood gas analysis can help the clinician better management of Organophosphate poisoning cases.

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